

20675

S/120/61/000/001/006/062
EO32/E114

A High-Frequency Ion Source With Discharge Taking Place in the Vapours of Salts

upper heater prevents the condensation of the working substance at the other end of the discharge chamber. The coil 4 consists of 4 turns of a copper tube, 6 mm in diameter, supplied by a high-frequency oscillator consisting of a push-pull circuit based on two ГИ-6-Б (GI-6-B) triodes. The oscillator wavelength is 15 m and details of the circuit have been given by Ya.M. Fogel' et al. in Ref.8. The total ion current is measured with the aid of a Faraday cup, and a mass-spectrometric analysis of the ion beam was carried out with the aid of the apparatus described by Ya.M. Fogel' and L.I. Krupnik in Ref.9. The source has been used with NaCl and NiCl₂. A mass-spectroscopic analysis of the ion beam obtained with NaCl is illustrated in Fig.6. Ion currents of the order of 1 mA can be obtained with this source, the average lifetime being 50 hours, and the average consumption of the working material 30 mg/hour. Acknowledgements are expressed to A.D. Timofeyev, L.I. Krupnik and A.A. Kalmykov who took part in the development of the design of this source.

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S/120/61/000/001/006/062
E032/E114

A High-Frequency Ion Source With Discharge Taking Place in the
Vapours of Salts

There are 8 figures and 9 references: 7 Soviet and 2 English.

ASSOCIATION: Fiziko-tekhnicheskiy institut AN USSR
(Physico-technical Institute. AS Ukr.SSR)

SUBMITTED: February 25, 1960

Card 4/5

07170

S/056/61/040/001/003/037
B102/B204

26.23/2

AUTHORS:

Fogel', Ya. M., Koval', A. G., Levchenko, Yu. Z.

TITLE:

Production of slow negative ions in single collisions between fast negative hydrogen and oxygen ions and gas molecules

PERIODICAL:

Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 40, no. 1, 1961, 13-22

TEXT: In order to obtain new data on the mechanisms underlying the production of slow negative ions in interaction between fast negative ions with gas molecules, the production cross sections of negative ions in collisions of H^- and O^- ions with energies of 10-50 keV with O_2 , CCl_4 , and SF_6 molecules were measured and the negative and positive ions produced in the gas were determined by mass spectroscopy. The experimental arrangement used has already been described in previous papers (Refs. 2, 3). The ion production cross section σ_i^- was measured by means of the well-known potential method. First, $i_H^-/I_O^- = f(H)$ and $i_H^-/I_O^- = f(V)$ were measured, where i_H^- is the negative current on the measuring electrode in the presence of a magnetic field, and I_O^- is the current of the initial beam. Thus, $\sigma_i^- = i_H^-/I_O^- nL$ could be

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Production of slow negative ...

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determined, where n is the number of gas molecules per cm^3 and L is the length of the measuring electrode. Also the characteristics $i_H^-/i_O^- = f(p)$ were recorded, as well as $I_n^-/I_O^- = f(p)$, where I_n^- is the current in the maximum of a given mass spectral line. For the pair $H^- - O_2$, σ_1^- was measured as amounting to $(1-3) \cdot 10^{-17} \text{ cm}^2$, for the pair $O^- - O_2$, σ_1^- was higher by one order of magnitude. It was further found that σ_1^- is independent of the ion mass, and that σ_1^- decreases with increasing ion velocity, according to the formula $\sigma_1^- = \sigma_0 e^{-kv}$. It was mass-spectroscopically established that on oxygen, above all the process $A^- + O_2 \rightarrow A + O_2^-$ takes place, the formation of excited O_2^- or $O^- + O^+$ was little probable. For the pair $H^- - CCl_4$, σ_1^- turned out to be practically constant within the entire velocity range studied, for the pair $O^- - CCl_4$, σ_1^- decreases with increasing ion velocity according to the same formula as has been found for oxygen. The most probable process for the pair $O^- - CCl_4$ appears to be that an excited molecule

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Production of slow negative ...

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ion is formed, which decays according to the scheme $\text{CCl}_4^{*-} \rightarrow \text{Cl}^- + \text{CCl}_3$, and for the pair $\text{H}^- - \text{CCl}_4$ a simple dissociation: $\text{CCl}_4 \rightarrow \text{Cl}^- + \text{CCl}_3^+$. The processes $\text{CCl}_4^{*-} \rightarrow \text{CCl}_3^- + \text{Cl}$ and $\text{CCl}_4 \rightarrow \text{CCl}_3^- + \text{Cl}^+$ respectively are of low probability. The σ_i^- values of the processes $\text{H}^- + \text{SF}_6$ and $\text{O}^- + \text{SF}_6$ were only to a low degree dependent on the initial ion velocity. In the charge exchange reaction $\text{O}^- + \text{SF}_6$ above all F^- ions were formed (according to the reaction $\text{SF}_6^- \rightarrow \text{SF}_5^- + \text{F}^-$), and only few SF_5^- ions according to $\text{SF}_6^- \rightarrow \text{SF}_5^- + \text{F}$. Furthermore, the spectra of negative ions, formed in collisions between H^- and O^- with Freon molecules (CCl_2F_2) were studied, where in the spectrum, besides F^- , Cl^- , and C^- , also about 50% H^- ions occurred. σ_i^- was about $2.5 \cdot 10^{-18} \text{ cm}^2$ for $\text{H}^- - \text{CCl}_2\text{F}_2$ pairs, i.e., 1/25 of the value for $\text{H}^- - \text{CCl}_4$. Furthermore, collisions between H^- and O^- on the one hand, and CO , CO_2 , H_2O , NO , and NH_3 on the other hand were studied. In the reaction $\text{O}^- + \text{H}_2\text{O}$, 58% H^-

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and 42% O^- could be found in the spectrum, i.e., the two decay reactions. $H_2O^- \rightarrow H^- + OH$ and $H_2O^- \rightarrow O^- + H_2$ occurred with nearly the same probabilities. In the reaction $O^- - CO_2$, 85% O^- and only 15% O_2^- ions could be observed, i.e., the process $CO_2^- \rightarrow C + O_2^-$ was much more improbable than $CO_2^- \rightarrow CO + O^-$. For all reactions studied, the electron "adhesion" reactions were compared. It was shown that both σ_1^- and the curves $\sigma_1^-(v)$ for processes of free electron adhesion to molecules differ essentially from the charge exchange processes between negative ions and the same molecules. This is due to the fact that in the first case a free electron is added, i.e., the curve $\sigma_1^-(v)$ has resonance character, in the latter case, however, the electron goes over from a discrete state (in the ion) to another discrete state (in the molecule). The authors thank A. F. Khodyachikh for taking part in the measurements, and Professor A. K. Val'ter for his interest in the work. R. N. Il'in, V. V. Afrosimov, N. V. Fedorenko, and N. S. Buchel'nikova are mentioned. There are 4 figures, 1 table, and 21 references: 8 Soviet-bloc and 13 non-Soviet-bloc.

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Production of slow negative ...

S/056/61/040/001/003/037
B102/B204

ASSOCIATION: Fiziko-tehnicheskii institut Akademii nauk Ukrainskoy SSR
(Institute of Physics and Technology of the Academy of
Sciences Ukrainskaya SSR)

SUBMITTED: June 27, 1960

Legend to the table: 1) Secondary ion, 2) Particle of the primary beam,
3) Secondary ion, 4) Particle of the primary beam, 5) Secondary ion,
6) Particle of the primary beam.

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Production of slow negative ...

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| CCl ₂ | | | | SF ₆ | | | | CCl ₂ F ₂ | | | |
|--------------------------------|--------------------------------|----------------|-------|-------------------------------|-------------------------------|------|--|---------------------------------|----------------|------|--|
| 1 Вторич- ный ион | Частнца первичного пучка* 2 | | | 3 Вторичный ион | Частнца пер- вичного пучка | | 5 Вторичный ион | Частнца первичного пучка 6 | | | |
| | O ⁻ | H ⁻ | e | | O ⁻ | e | | O ⁻ | H ⁻ | e | |
| Cl ⁺⁺ | 2 | 0,34 | — | F ⁺ | 16,2 | 1,93 | C ⁺⁺ | 0,17 | — | — | |
| Cl ⁺ | 38,3 | 28 | 14,1 | S ⁺ | 21 | 3,4 | F ⁺⁺ | 0,02 | — | — | |
| CCl ₂ ⁺⁺ | — | — | 0,4 | SF ⁺ | 13,4 | 5,24 | C ⁺ | 6,9 | 4,05 | 4,9 | |
| CCl ₂ ⁺ | 9,2 | 12,5 | 12 | SF ₂ ⁺ | 7,1 | 3,47 | F ⁺ | 7,5 | 4,18 | 0,65 | |
| CCl ₂ ⁺ | 18,8 | 15 | 14,2 | SF ₃ ⁺ | 8,5 | 16,8 | CCl ⁺⁺ | 0,6 | 0,7 | — | |
| CCl ₂ ⁺⁺ | — | — | 0,8 | SF ₄ ⁺ | 2,5 | 5,43 | CF ⁺ | 14,3 | 17,2 | 10,8 | |
| Cl ₂ ⁺ | 1,0 | 1,20 | 0,18 | SF ₅ ⁺ | 31,2 | 60,2 | Cl ⁺ | 20 | 18,35 | 10 | |
| CCl ₃ ⁺ | 23,5 | 38 | 51,3 | SF ₆ ⁺⁺ | — | 0,82 | CCl ₂ F ₂ ⁺⁺ | — | — | 0,48 | |
| CCl ₃ ⁺ | 0,05 | 0,09 | 0,01 | SF ₆ ⁺ | — | 0,22 | CCl ⁺ +CF ₂ ⁺ | 39,3 | 40,5 | — | |
| C ⁺ | 7,1 | 3,8 | 7,4 | SF ₆ ⁺⁺ | — | 2,46 | CCl ⁺ | — | — | 3,5 | |
| C ⁻ | 0,13 | 0,28 | 0,01 | SF ₆ ⁻ | 63 | 98,1 | CF ₂ ⁺ | — | — | 8,1 | |
| Cl ⁻ | 99,4 | 99,3 | 99,9 | SF ₆ ⁻ | 3,5 | 3,9 | CCl ₂ F ⁺⁺ | — | — | 0,4 | |
| CCl ⁻ | 0,09 | 0,18 | 0,005 | F ⁻ | 33,5 | 0,04 | CClF ⁺ | 8,4 | 12,3 | 2,3 | |
| Cl ₂ ⁻ | 0,2 | 0,24 | 0,1 | | | | CCl ₂ F ⁺ | — | — | 4,3 | |
| CCl ₂ ⁻ | 0,12 | — | — | | | | CClF ₂ ⁺ | 2,5 | 2,8 | 54 | |
| | | | | | | | F ₂ ⁺⁺ | — | — | 0,21 | |
| | | | | | | | Cl ₂ ⁺ | — | — | 0,16 | |
| | | | | | | | CCl ₂ F ₂ ⁺ | 0,1 | — | 0,16 | |
| | | | | | | | C ⁻ | 4 | 4,1 | 0,22 | |
| | | | | | | | F ⁻ | 73,5 | 74,6 | 30,4 | |
| | | | | | | | Cl ⁻ | 22,6 | 21,3 | 69,4 | |

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* Для ионов O⁻ скорость $v = 6 \cdot 10^8$ см/сек, для ионов H⁻ — $v = 2,5 \cdot 10^8$ см/сек, а для электронов $v = 5,18 \cdot 10^8$ см/сек

FOGEL', YA. M.

Doc Phys-Math Sci, Diss -- "Investigation of certain processes in the capture and loss of electrons by fast single-charge positive ions, neutral atoms and negative ions in single collisions with gas molecules". Khar'kov, 1961. 30 pp, 22 cm (Phys-Tec Inst, Acad of Sci UkrSSR), 250 copies, No charge, 26 works by the author listed at end of text (KL, No 9, 1961, p 174, No 24242). /61-51096/

FOGEL', YA. M.

Dissertation defended for the degree of Doctor of Physicomathematical Sciences at the Technical Physics Institute imeni A.F. Ioffe in 1962:

"Investigations of Severa Processes of Electron Capture and Loss by High Single-Charged Positive Ions, Neutral Atoms, and Negative Ions Upon Single Collisions with Gas Molecules."

Vest. Akad. Nauk SSSR. No. 4, Moscow, 1963, pages 119-145

26.2531
26.231V

41572
S/057/62/032/010/010/010
B104/B102

AUTHORS: Fogel', Ya. M., Rekova, L. P., and Kolot, V. Ya.

TITLE: Thermionic emission of metals in various gases

PERIODICAL: Zhurnal tekhnicheskoy fiziki, v. 32, no. 10, 1962, 1259-1265

TEXT: Thermionic emission from nickel and platinum in air, O_2 , H_2 , CCl_4 , and NH_3 of various densities was studied using the experimental arrangement shown in Fig. 1. The emitters (21.5·0.5 mm) were annealed in air at 800-900°C; after which the surface was purified mechanically, rinsed with benzine and attached inside the diode chamber. At a pressure of $(1-2) \cdot 10^{-6}$ mm Hg the emitter was held at 1200°C until the emission current assumed a constant value. The first chapter describes experiments made at atmospheric pressure. The nickel emitter had a temperature of 750°C and was placed in an air current. When CCl_4 was added to the air, the emission current increased (maximum effect at a CCl_4 concentration of 10^{-6}). In air, the emission current was smaller, than in vacuo. If CCl_4 was added first a

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S/057/62/032/010/010/010
B104/B102

Thermionic emission ...

current peak was observed; the current then dropped to a constant value below the vacuum but above that obtained in an air current. It has been found that the changes in the total thermionic emission current after pumping off the gases acting on the emitter, are due to changes in the emission of alkaline ions. The second chapter describes experiments made at low pressures. At an O_2 pressure of $\sim 10^{-4}$ mm Hg the total thermionic emission current is lower than in air. This decrease is caused by a decrease in the emission of alkaline ions. When CCl_4 or a mixture of CCl_4 and O_2 were caused to act on the emitter no emission other than that of alkali metal ions was observed. The changes in the total emission current are entirely determined by changes in the emission alkali metal ions. There are 5 figures.

ASSOCIATION: Khar'kovskiy gosudarstvennyy universitet im. A. M. Gor'kogo
(Khar'kov State University imeni A. M. Gor'kiy)

SUBMITTED: November 9, 1961 (initially)
February 6, 1962 (after revision)

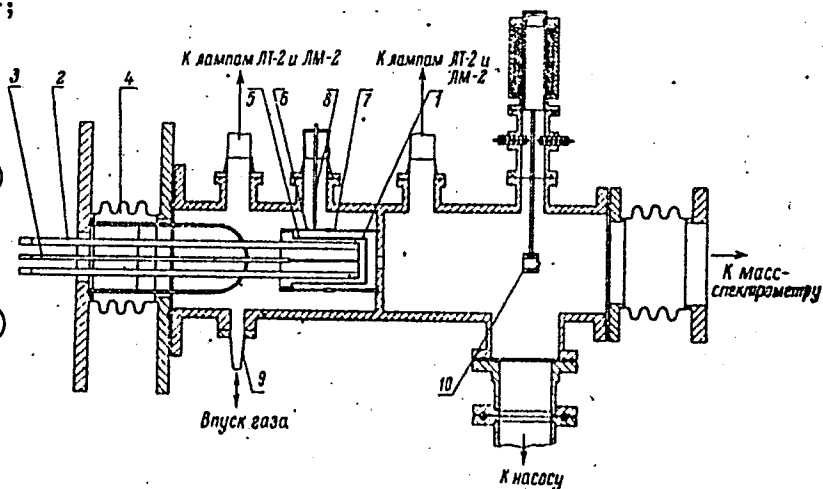
Card 2/3

Thermionic emission ...

S/057/62/032/010/010/010
B104/B102

Fig. 1. Experimental arrangement.

Legend: (1) emitter;
(2) Mo rod; (3)
thermocouple; (4)
siphon; (5) steel
cylinder; (6) in-
sulated cylinder;
(7) glass joint; (8)
connection between
cathode and an
instrument for
measuring the total
emission current; (9)
nipple; (10) beam
catcher.



Card 3/3

5.4900
24.6610
26.231Y

37096

S/056/62/042/004/002/037
B102/B104

AUTHORS: Pilipenko, D. V., Fogel', Ya. M.

TITLE: Electron capture and loss by fast hydrogen atoms passing through molecular gases

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 42, no. 4, 1962, 936-943

TEXT: The electron capture and loss cross sections σ_{01} and σ_{0-1} were measured as dependent on the energy E of the hydrogen atoms passing through CO, H₂, N₂ and O₂. The results are compared with other publications, and the hypotheses proposed by Donahue et al. (Phys. Rev. Lett. 3, 470, 1959; Phys. Rev. 118, 1233, 1960; Nature, 186, 1038, 1960) and Bukhteyev et al. (ZhTF, 31, 688, 1961) to explain the formation of slow negative ions are discussed. The physical meaning of the US publications is said to be unclear. Electron loss of the H⁰ in CO may occur either by formation of stable CO⁻ (H + CO → H⁺ + CO⁻) or unstable CO⁻ ions, the latter disintegrating into C and O; one of them is negatively charged, or both

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Electron capture and loss by ...

S/056/62/042/004/002/037
B102/B104

are neutral and a free electron appears. $\sigma_{01}(E)$ of these processes for $10 < E < 40$ is a fine-structured curve. $\sigma_{01}(E)$ for H_2 gas increases in the same energy range by one order of magnitude and shows several extrema; for O_2 and N_2 the structure is very indistinct. All σ_{01} values are of the order of 10^{-16} cm^2 . The electron capture cross sections $\sigma_{0-1}(E)$ show a structure for H_2 and CO , none for O_2 . The latter curve has only one maximum at 10 kev; then it decreases monotonically. In the $H^0 \rightarrow H^-$ process in CO , CO^+ is formed which dissociates into charged fragments. For this process σ_{0-1} is of the order of 10^{-17} and decreases monotonically at hydrogen energies above 35 kev. The structure of the curves can be explained by Massey's adiabatic criterion. There are 5 figures and 1 table.

ASSOCIATION: Fiziko-tekhnicheskii institut Akademii nauk Ukrainskoy SSR.
(Physicotechnical Institute of the Academy of Sciences
Ukrainskaya SSR)

SUBMITTED: September 20, 1961

Card 2/2

FOGEL', Ya.M.; NADYKTO, B.T.; RYBALKO, V.F.; SLABOSPITSKIY, R.P.;
KOROBCHANSKAYA, I.Ye.

Possibility of using secondary ion-ion emission phenomena
in studying heterogeneous catalytic reactions. Dokl.
AN SSSR 147 no.2:414-417 N '62. (MIRA 15:11)

1. Khar'kovskiy gosudarstvennyy universitet im. A.M. Gor'kogo.
Predstavleno akademikom A.N. Frumkinym.

(Catalysis)
(Ionization of gases)

ABRAMENKOV, A.D.; RYBALKO, V.F.; FOGEL', Ya.M.

Ionization of a supersonic jet of mercury vapor by a beam of
hydrogen ions. Izv. vys. ucheb. zav.; fiz. no.5:76-81 '63. (MIRA 16:12)

1. Khar'kovskiy gosudarstvennyy universitet imeni A.M.Gor'kogo.

L 12959-63
ESD-3/SSD

EPF(c)/ENG(k)/EWP(q)/EWT(m)/EWT(l)/BDS/ES(w)-2 APTC/ASD/
Pz-4/Pab-4 IJP(C)/AT/JD S/109/63/008/004/020/030

AUTHORS: Fogel', Ya. M., Slabospitskiy, R. P., Slavnyy, A. S.

TITLE: Mass-spectrometric investigation of secondary ion emission in the bombardment of platinum by ions of argon

PERIODICAL: Radiotekhnika i elektronika, v. 8, no. 4, 1963, 684-690

TEXT: This paper was the subject of a report to the 10th Conference on Cathode Electronics held at Tashkent in November 1961. It describes the results of an investigation of the mass-spectrum composition of a secondary positive and negative ion emission which arises when a platinum surface is bombarded with Ar^+ ions having an energy of 22 kev. Also described are the changes in the mass spectrum of the secondary emission arising as a result of the action of gases N_2 , O_2 , NH_3 , NO and H_2O upon a previously de-gassed surface of platinum. The relationship between the number of secondary ions knocked off and the temperature of the target is also investigated. The authors feel there is a "profound relationship" between the processes occurring on the surface of the metal and the behavior of the mass spectrum of the secondary ion emission. They state it would be desirable to conduct a simultaneous investigation of the mass spectrum of the secondary ion emission

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L 12959-63

S/109/63/008/004/020/030

Mass-spectrometric investigation.....

and the mass spectrum of the gas phase, since in some cases a process of desorption of particles in the gas phase occurs, which alters the composition of the latter.

ASSOCIATION: Kharkovskiy gosudarstvennyy universitet im. A. M. Gor'kovo (Kharkov State University imeni A. M. Gor'kiy)

SUBMITTED: 26 April 1962: after revision: 21 September 1962

Card 2/2

S/033/63/040/002/017/021
E001/E120

AUTHORS: Polyakova G.N., Fogel' Ya.M., and Ch'iu Yu-mei

TITLE: Emission spectra of rarefied molecular gases excited by a mixed beam of protons and hydrogen atoms

PERIODICAL: Astronomicheskiy zhurnal, v.40, no.2, 1963, 351-362

TEXT: The authors describe laboratory experiments for studying the emission spectra of gases excited by beams of various particles in order to identify the constituents of planetary atmospheres. The following gases were investigated: N_2 , O_2 , CO_2 , air, CO, H_2 , H_2O , NH_3 and CH_4 . Mixed beams of protons and hydrogen atoms with energies of 38 keV were used. The equipment and methods of experiments are described. The spectrum region from 3600 to 6700 Å was investigated. The authors describe the results of measuring spectrograms of emission spectra and analyze them. In the spectra of N_2 , O_2 and air were observed the H_α and H_β lines of the Balmer series. In the spectrum of N_2 appear bands of the first negative system of N_2^+ molecules, of

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Emission spectra of rarefied ...

S/033/63/040/002/017/021
EOC1/E120

high intensity. In the oxygen emission spectrum bands of O_2 molecules and lines of O I spectrum are absent. Faint bands of the first negative system of O_2^+ molecules and lines of O II spectrum are observed. The air emission spectrum consists of the superposition of the spectra of N_2 and O_2 . Specific features of their spectra are discussed and explained. From a comparison of the spectrum of air with auroral spectra it is concluded that in the excitation of the latter electrons play a considerable part. This conclusion is in agreement with direct data obtained by means of rockets. In the emission spectrum of CO the following Balmer series lines are observed: H_α , H_β and H_γ , and in the CO_2 spectrum, the H_δ line also. The system of CO^+ molecule bands, observed in cometary tails, appears in the CO spectrum. Bands of the system of Fox, Daffendack and Barker are most intense in the emission spectrum of CO_2 . These spectra were compared with the spectra of Venus nightsky glow photographed by N.A. Kozyrev and G. Newkirk, and the presence of CO_2 in the Venusian atmosphere was confirmed. The conclusions by Kozyrev and Warner on the presence of N and O in the atmosphere of Venus are not considered to be

Card 2/3

Emission spectra of rarefied ...

S/033/63/040/002/017/021
E001/E120

well founded. In the emission spectra of H_2 , H_2O , NH_3 and CH_4 the lines of H_α , H_β , H_γ and H_δ were observed with a considerably higher intensity than in other gases investigated. In the spectrum of H_2O vapor a number of very weak lines of O II were observed. The investigations conducted may provide useful information of geophysical and astrophysical importance; it may be used for comparison with various types of emission spectra observed in atmospheres of the planets of the solar system and for studying auroras. It is intended to continue a broad program of similar investigations. There are 1 figure and 3 tables.

ASSOCIATION: Khar'kovskiy gos. universitet im. A.M. Gor'kogo
(Khar'kov State University imeni A.M. Gor'kiy)

SUBMITTED: June 11, 1962

Card 3/3

L 13616-63 INT(1)/BDS AFFTC/ASD/ESD-3

ACCESSION NR: AP3003103

S/0056/63/044/006/1818/1822

59
54

AUTHOR: Pilipenko, D. V.; Fogel', Ya. M.

TITLE: Electron loss and capture by fast atoms passing through molecular gases

SOURCE: Zhurnal eksper. i teor. fiziki, v. 44, no. 6, 1963, 1818-1822

TOPIC TAGS: electron loss and capture, fast atomic collisions, Massey adiabatic criterion

ABSTRACT: The cross sections were measured for electron loss and electron capture by hydrogen atoms in NO and by carbon atoms in CO, in order to provide additional confirmation of the previously suggested causes of the structure observed in the curves of the electron-loss cross section vs. energy, and in order to find in which molecular gases this structure appears. The authors' preliminary hypothesis (ZhETF, v. 42, 936, 1962), based on experimental material, is that structure in the cross section vs. energy curve is observed when the probability of formation of a stable negative molecular ion as a result of capture by a gas molecule is very low, but when this ion can dissociate into a negative ion and a neutral atom this probability is calculated for several processes, and the structure for the energy dependence curves of electron loss and electron capture for the H - NO pair is explained by means of the Massey adiabatic criterion. "We are grateful to the
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L-13616-63

ACCESSION NR: AP3003103

5
students of the Khar'kovskiy gosudarstvennyy Universitet (Kharkov State University)
V. I. Zinenko and V. G. Dyatlov, who took part in the measurements. It is our
pleasant duty to thank Professor A. K. Val'ter for his constant interest in this
work." Orig. art. has: 6 formulas and 4 figures.

ASSOCIATION: Fiziko-tekhnicheskii institut Akademii nauk Ukrainskoy SSR
(Physicotechnical Institute, Academy of Sciences, UkrSSR)

SUBMITTED: 11Jan63

DATE ACQ: 23Jul63

ENCL: 00

SUB CODE: 00

NO REF SOV: 006

OTHER: 012

Card 2/2

L 13615-63

EWI(m)/BDS - AFFTC/ASD

ACCESSION NR: AP3003104

S/0056/63/044/006/1823/1825

53
52

AUTHOR: Kozlov, V. F.; Fogel', Ya. M.; Stratiyenko, V. A.

TITLE: Two-electron charge exchange of low-energy protons 19

SOURCE: Zhurnal eksper. i teor. fiziki, v. 44, no. 6, 1963, 1823-1825

TOPIC TAGS: two-electron charge exchange, low-energy protons, hydrogen, argon, krypton, adiabatic region

ABSTRACT: The effective cross sections for two-electron charge exchange of 0.5 - 5 keV protons in hydrogen, argon, and krypton were measured in order to study the behavior of this cross section as a function of the relative velocity of the colliding particles in the adiabatic region. This is a continuation of the shape of the analogous cross-section curves for Li, Na, and K positive ions, made by Ya. M. Fogel', V. F. Kozlov, and G. N. Polyakova (ZhETF, v. 39, 1186, 1960), in which it was indicated that the cross section decreases more slowly than would be called for by the exponential formula postulated by Hasted (J. Appl. Phys. v. 30, 25, 1959). The curve obtained for the energy region below 5 keV joins satisfactorily the curve obtained for protons of energy greater than 5 keV by the mass-spectrometer method, thus affording a check on the reliability of the experimental procedure. The results indicate that in the case of argon and krypton this energy

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L 13615-63
ACCESSION NR: AP3003104

region cannot be regarded as adiabatic, but in the case of hydrogen it can, and the Hasted formula is applicable. Orig. art. has: 2 figures.

ASSOCIATION: Fiziko-tekhnicheskiy institut Akademii nauk Ukrainskoy SSR
(Physicotechnical Institute, Academy of Sciences, Ukrainian SSR)

SUBMITTED: 11Jan63

DATE ACQ: 23Jul63

ENCL: 01

SUB CODE: 00

NO REF SOV: 006

OTHER: 002

Card 2/3

L 13615-63

ACCESSION NR: AP3003104

ENCLOSURE: 1

Fig. 1

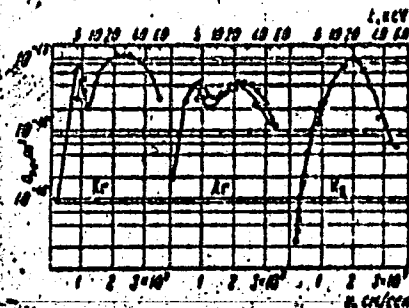


Fig. 2

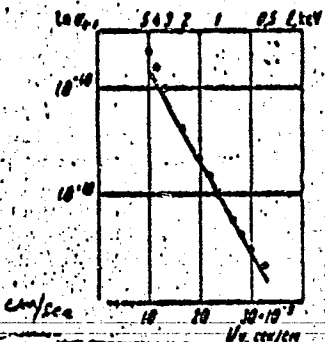


Fig. 1. Cross sections of two-electron charge exchange of protons in hydrogen, argon, and krypton: o - present data, o - data of [6], Δ - data of [7].

Fig. 2. Plot of two-electron charge-exchange cross section against reciprocal of velocity for hydrogen.

Card 3/3

~~FOGEL~~, Ya. M.; NADYKTO, B.T.; RYBALKO, V.F.; SHVACHKO, V.I.; KOROBCHANSKAYA,
I.Ye.

Study of the catalytic oxidation of ammonia on platinum by the
secondary ion emission method. Kin. i kat. 5 no.3:496-504 My-
Je '64. (MIRA 17:11)

1. Khar'kovskiy gosudatstvennyy universitet imeni Gor'kogo.

FOGEL', Ya.M.; NADYKTO, B.T.; SHVACHKO, V.I.; RYBALKO, V.F.; KOROBCHANSKAYA,
I.Ye.

Use of the secondary ion emission method for investigating
catalytic reactions between ammonia and nitric oxide, and the
decomposition of nitric oxide on platinum. Kin. 1 kat. 5
no.5:942-944 S-O '64. (MIRA 17:12)

1. Khar'kovskiy gosudarstvennyy universitet imeni Gor'kogo.

ACCESSION NR: AP4009987

S/0109/64/009/001/0144/0147

AUTHOR: Rekova, L. P.; Strel'chenko, S. S.; Fogel', Ya. M.;
Hua, Hsin-sheng

TITLE: Effect of various gases on the thermionic emission of tungsten

SOURCE. Radiotekhnika i elektronika, v. 9, no. 1, 1964, 144-147

TOPIC TAGS: thermionic emission, tungsten thermionic emission, gas aided thermionic emission, carbon tetrachloride aided thermionic emission, sodium ion emission, potassium ion emission

ABSTRACT: The experimental hookup and methods of measurement were described in the Ya. M. Fogel', et al. article (ZhTF, 1962, 32, 10, 1259). The effect of CCl_4 , Cl_2 , O_2 and H_2 on Na^+ and K^+ ions emitted by incandescent tungsten was investigated. It was found that, within 700-1,300C, the admission of CCl_4 into a diode envelope results in the increased emission of K^+ from a W.

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ACCESSION NR: AP4009987

emitter. Na^+ ion emission decreases in the 700-1,000C range and increases at temperatures over 1,100C. Within 1,000-1,100C, no effect of CCl_4 on Na^+ ion emission was observed. The effect of CCl_4 on K^+ ion emission also depends on whether or not that emission is accompanied by Na^+ ion emission: with no Na^+ ion emission, CCl_4 causes a decrease in the K^+ ion emission. O_2 and H_2 do not appreciably change the Na^+ and K^+ ion emission. The results are compared with those of Pt emission. "We consider it our pleasant duty to thank A. K. Val'ter for his constant interest and attention to the project." Orig. art. has: 3 figures.

ASSOCIATION: none

SUBMITTED: 15Dec62

DATE ACQ: 10Feb64

ENCL: 00

SUB CODE: GE

NO REF SOV: 001

OTHER: 004

Card 2/2

L 6801-65
ACCESSION NR: AP4044657

currents as low as 5×10^{-17} A could be measured with the aid of a secondary electron multiplier. An 0.3 mA beam of 600 V electrons was projected parallel to the surface of the emitter and close to it. These electrons served to ionize any molecules leaving the emitter and thus made it possible to investigate the evaporation of neutral molecules. NaCl^+ ions were obtained from a Pt emitter in the simultaneous presence of O_2 and CCl_4 at temperature thresholds from 950°C for a fresh emitter to as high as 1300°C for a depleted one. The presence of CCl_4 without O_2 was not sufficient to give rise to these ions. When the emitter was heated for a time in the presence of O_2 , however, the O_2 was pumped out and CCl_4 admitted, emission of NaCl^+ was observed, but at a higher threshold temperature than in the presence of both gases. When a Pt emitter was heated in the presence of O_2 , and CCl_4 was admitted, not only did NaCl^+ ions appear, but also Na^+ ions; and when the CCl_4 was pumped out, not only did the emission of NaCl^+ nearly cease, but also that of Na^+ . No products of reactions between Na or K and CCl_4 were emitted by a hot W surface. Ions with mass numbers 59, 69, 73, 94 and 101 were observed. These are ascribed to surface ionization of organic molecules, which may have entered the system from the mechanical forepump (the diffusion pumps employed mercury vapor). "In conclusion, I consider it my pleasant duty to express my sincere gratitude to Prof. A. K. Val'ter for his constant attention and interest in the work." Orig.art.has: 3 figures.

2/3

L 6801-65

ACCESSION NR: AP4044657

ASSOCIATION: Khar'kovskiy gosudarstvennyy universitet (Kharkov State University)

SUBMITTED: 00

ENCL. 00

SUB CODE: IC,EM

NR REF SOV: 005

OTHER:002

L 23051-65 EWG(j)/EWT(m)/EPF(c)/EPR/ENP(t)/ENP(b) Pr-4/Ps-4 IJF(c)

ACCESSION NR: AP4047980

JD

S/0076/64/038/010/2397/2402

AUTHOR: Fogel', Ya. M. (Khar'kov); Nadykto, B. T. (Khar'kov); Shvachko, V. I. ^B
(Khar'kov); Rybalko, V. F. (Khar'kov)

TITLE: Secondary ion emission investigation of the state of oxygen adsorbed on
a silver surface ²⁷

SOURCE: Zhurnal fizicheskoy khimii, v. 38, no. 10, 1964, 2397-2402

TOPIC TAGS: secondary oxygen ion emission, oxidation mechanism, silver oxidation catalyst, negative oxygen ion, positive oxygen ion

ABSTRACT: In order to study the mechanism of the oxidation process on a metallic catalyst (silver catalyst used in ethylene oxidation) the state of the oxygen adsorbed on the surface was determined. The mass spectra of the secondary positive and negative ions formed by bombarding a silver ribbon with a primary beam of argon ions in an oxygen atmosphere were studied. The dependence of the intensity of the mass spectral lines on the oxygen pressure and the ribbon temperature was determined. In the 20-500C range the oxygen adsorbed on the silver surface was partly atomic and partly molecular, and some of the molecular oxy-

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L 23051-65

ACCESSION NR: AP4047980

2

gen was in the state of a negative molecular ion O_2^- . The state of the charge of the atomic oxygen was not determined. At temperatures above 300C the effect of the oxides on the silver surface on the secondary emission of oxygen ions was insignificant; the latter were formed only from oxygen adsorbed on the silver surface. Below 300C the surface oxides could be involved in the secondary emission of oxygen ions, but apparently to only a small extent. Thus if the oxygen in the surface oxides on the silver plays a significant role in catalytic oxidation reactions, the activity of the silver catalyst will drop at temperatures above 300C. In conclusion we wish to sincerely thank prof. A. K. Valter for constant advice and interest in the work." Orig. art. has 3 figures and 3 equations

ASSOCIATION: Khar'kovskiy gosudarstvennyy universitet im. A. M. Gor'kogo
(Kharkov State University)

SUBMITTED: 17Oct63

ENCL: 00

SUB CODE: GC, NP

NO REF SOV: 005

OTHER: 002

Card 2/2

FOGEL', Ya.M.; NADYKTO, B.T.; SHVACHKO, V.I.; RYBALKO, V.F.;
KOROBCHANSKAYA, I.Ye.

Catalytic oxidation of ammonia on platinum studied by the method
of secondary ionic emission. Dokl. AN SSSR 155 no.1:171-174 Mr
'64. (MIRA 17:4)

1. Khar'kovskiy gosudarstvennyy universitet im. A.M.Gor'kogo.
Predstavleno akademikom A.N.Frumkinym.

L 58872-65

ACCESSION NR: AP5017231

2
sion, we are sincerely grateful to A. K. Val'ter for his constant interest in the
work. orig. art. has: 4 figures.

ASSOCIATION: Khar'kovskiy gosudarstvennyy universitet im. A. M. Gor'kogo (Kharkov
State University)

DATE: 1964

ENCL: 00

RE: 00, MM

NO: 01

OTHER: 001

Card 2/2

POLYAKOVA, G.N.; POPOV, A.I.; FOGEL', Ya.M.

Characteristics of photomultipliers for measuring weak
luminous fluxes. Prib. i tekhn.eksp. 10 no.5:198-201
S-O '65. (MIRA 19:1)

1. Fiziko-tekhnicheskiy institut AN UkrSSR, Khar'kov.
Submitted Sept.7, 1964.

L 52609-65 EWT(1)/EEC(b)-2/EWA(h) Feb

ACCESSION NR: AP5013346

UR/0109/65/010/005/0929/0935

AUTHOR: Polyakova, G. N.; Popov, A. I.; Fogel', Ya. M. 17
B

TITLE: Study of the height distribution of pulses at the output of a multiplier phototube

SOURCE: Radiotekhnika i elektronika, v. 10, no. 5, 1965, 929-935

TOPIC TAGS: multiplier phototube, photomultiplier, pulse height distribution

ABSTRACT: The results of an experimental investigation of the pulse-height distribution in FEU-64, FEU-51, FEU-27, FEU-46, 6094B EMI, and 9502B EMI photomultipliers at +20C and -70C are reported. It was found that, in photomultipliers having a small photocathode area and activated dynodes, the dark-current pulses are largely generated by the dynode system. The height distribution of light-generated pulses agrees well with the Poisson law for FEU-64, under red and blue light, at +20C and -70C. This fact permits reliable selection of the

Card 1/2

L 52609-05

ACCESSION NR: AP5013346

discrimination level when the luminous intensity is measured by a quantum-counting photomultiplier. The pulse-height distribution in a gamma-irradiated (^{60}Co) FEU-64 was also measured. Orig. art. has: 8 figures and 1 table. [03]

ASSOCIATION: none

SUBMITTED: 03Feb64

ENCL: 00

SUB CODE: EC

NO REF SOV: 004

OTHER: 000

ATD PRESS: 4010

sk.
Card 2/2

2626-66 EMT(1)/EMT(m)/EFE(n)-2/ENG(m)/EPA(w)-2/T/EMR(l)/EMP(b)/EPA(c) IUP(c)
ACC NR: AP5024043 JD/JG/AT SOURCE CODE: UR/0057/65/035/009/1642/1645

AUTHOR: Rekova, L. P.; Fogel', Ya. M.; Aleksandrov, A. P.

ORG: Khar'kov State University im. A. M. Gor'k'iy (Khar'kovskiy gosudarstvennyy universitet)

TITLE: On the mechanism of the influence of gases on the thermionic emission from platinum and tungsten

SOURCE: Zhurnal tekhnicheskoy fiziki, v. 35, no. 9, 1965, 1642-1645

TOPIC TAGS: thermionic emission, platinum, tungsten, alkali metal, gas, ionization, sodium, potassium, carbon tetrachloride, oxygen, lattice defect

ABSTRACT: An investigation was made of the influence of CCl_4 and O_2 on the emission of Na^+ and K^+ ions from sodium and potassium layers vacuum evaporated onto tungsten and platinum surfaces. The experimental setup, which included a mass spectrograph for the identification of the ions, and the methods of inquiry, described in an earlier paper (Fogel', Ya. M., L. P. Rekova, and V. Ya. Kolot. ZhTF, v. 32, no. 10, 1259, 1962) precluded any side effects which might have affected the measurements. Each experiment was performed twice, at temperatures below and above 1000C. The studies of the W-Na system showed that the introduction of CCl_4 does not change the current as a function of time. This indicates that CCl_4 does not influence the current of Na^+ ions from a Na layer deposited on W, even though, as is known, the gas

Card 1/2

UDC: 537.58

L 2626-66

ACC NR: AP5024043

strongly affects the emission of Na^+ ions from clean W emitters. For the Pt—K system, the introduction of CCl_4 caused a much sharper falling off of the current than takes place in high vacuum, the effect being the same as that observed with clean platinum emitters in the presence of a gas. The replacement of CCl_4 by O_2 showed that the effects are not correlated. In view of the results obtained, it is proposed that the process of the delivery of the alkali metal stored in the lattice defects of the clean emitter influences the changes in ionic emission caused by the presence of a gas. Orig. art. has: 2 figures. [ZL]

SUB CODE: SS/ SUBM DATE: 07Dec64/ ORIG REF: 003/ OTH REF: 001/ ATD PRESS: 4/24

Card 2/2

DP.

L 40775-65 DNT(1)
ACCESSION NR: AP5006486

S/0056/65/048/002/0404/0415

AUTHORS: Pilipenko, D. V.; Fogel', Ya. M.

TITLE: Composition of the slow ions produced on passage of fast hydrogen atoms through molecular gases 21

SOURCE: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 48, no. 2, 1965, 404-415

TOPIC TAGS: slow ion, molecular gas, mass spectrometry, spectrum line intensity, electron loss, electron capture, energy dependence

ABSTRACT: This is a continuation of earlier work by the authors (ZhETF v. 42, 936, 1962 and v. 44, 1818, 1963), aimed at obtaining additional confirmation of the earlier results by a study of the mass spectra of the slow positive and negative ions produced by fast hydrogen atoms passing through gaseous O₂, N₂, NO, and CO, with particular attention to the study of the intensity of the individual

Cerd 1/43

L 40775-65

ACCESSION NR: AP5006486

0

mass spectrum lines as a function of the energy of the fast atoms. Apparatus used in an earlier study (ZhETF v. 34, 579, 1958) has been reconstructed for this purpose. A schematic drawing of the redesigned apparatus shown in Fig. 1 of the Enclosure. The redesigned apparatus was used to measure the absolute cross sections for inelastic interaction processes of charged and neutral particles with gases by the potential and mass-spectrometer methods, and to analyze the slow ions. The measurements involved in the analysis of slow ions are described in detail elsewhere (ZhTF v. 26, 1941, 1956 and ZhETF v. 39, 548, 1960). Plots showing the variation of the intensity of the individual mass spectrum lines with the hydrogen-atom energy are presented and are compared with plots of the energy dependence of the cross sections for electron loss and capture by hydrogen atoms. It follows from the results that the structure in the energy dependence of the cross section for the interaction of hydrogen ions with NO and CO molecules is not associated with formation of molecular or atomic negative ions in the charge exchange of hydrogen atoms with

Card 2/4

L 40775-65
ACCESSION NR: AP5006486

4

these molecules. Although for slow positive ions the energy range in which structure is observed for the cross section and for the current-ratio curves are in agreement, it is very difficult to establish a correspondence between the individual peaks in the two structures, in view of the multiplicity and close spacing of the peaks. "We thank V. A. Gusev, student and thesis candidate at Khar'kov State University, who took part in the measurements, and Professor A. K. Val'ter for continuous interest." Orig. art. has: 9 figures and 6 formulas.

ASSOCIATION: Fiziko-tehnicheskii institut Akademii nauk Ukrainiskoy SSR (Physicotechnical Institute, Academy of Sciences, Ukrainian SSR)

SUBMITTED: 18Jul64

ENCL: 01

SUB CODE: NP

NR REF SOV: 012

OTHER: 011

Card 3/4

L 10236-66 EWT(1)/EWT(m)/T/EWP(t)/EWP(b)/EWA(m)-2 IWP(c) M
 ACC NR: AP6000192 SOURCE CODE: UR/0056/65/049/005/1402/1407
 AUTHOR: Pilipenko, D. V.; Gusev, V. A.; Fogel', Ya. M.
 ORG: Physicotechnical Institute, Academy of Sciences, Ukrainian SSR (Fiziko-
tekhnicheskii institut Akademii nauk Ukrainskoy SSR)
 TITLE: Electron loss and formation of slow negative ions in collisions of hydrogen
atoms and H⁻ ions with gas molecules
 SOURCE: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 49, no. 5, 1965,
 1402-1407
 TOPIC TAGS: ionization, electron loss, charge exchange, collision cross section
 ABSTRACT: This is a continuation of earlier work by the authors (ZhETF v. 48, 404;
 1965) dealing with charge exchange occurring during collisions between atoms and gas
 molecules. The present paper is devoted to a measurement of the effective cross sec-
 tion σ_{10} for the loss of an electron by negative ions of hydrogen with energy from
 3 to 30 kev by collision with O₂, NO, and CO. The apparatus was described in detail
 in the earlier paper. The authors measured also the cross sections σ_1 for the forma-
 tion of slow negative ions by collision of H and H⁻ with the same molecules in the
 same energy range. The plot of σ_{10} vs. the fast-particle energy ϵ for the H-CO pair
 has a structure which can be explained with the aid of the adiabatic Massey criterion.
 The magnitude of the cross section and the form of its energy depend on
 the nature of the target gas and on the binding energy of the electron in the fast
 particle. The cross section is largest for O₂, smallest for CO, and intermediate for

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L 10236-66

ACC NR: AP6000192

NO. It is concluded from the fact that the energy dependence for the H^- ions is the same for all the investigated gases that the maximum of σ_1 occurs at low energies. At the maximum, σ_1 is much larger for H^- than for H . With increasing particle energy, the cross sections for H^- and H come closer together and become approximately equal for O_2 and NO. The peaks on the $\sigma_1(e)$ curve correspond to the adiabatic Massey criterion. Authors thank Professor A. K. Val'ter for continuous interest in the work. Orig. art. has: 4 figures and 3 formulas. 3

SUB CODE: 20/ SUBM DATE: 20Jun65/ ORIG REF: 009/ OTH REF: 001/
 ATD PRESS: 4163 [02]

Card 2/2

L 46183-65 EWT(1)/EWT(m)/EPA(sp)-2/EPF(c)/EWA(d)/EPA(w)-2/EXC(+)/EWP(t)/
 EWP(t) EWT(1)/EWT(m)/EPA(sp)-2/EPF(c)/EWA(d)/EPA(w)-2/EXC(+)/EWP(t)/
 ACQUISITION NR: AP5010839 UR/0026/65/161/004/0886/0889

A. T. Shvachko, V. I. Nadykto, B. T. Fogel', Ya. M. Gergen, V. N.

TITLE: The use of secondary ion emission²¹ for investigation of corrosion processes on the surface of steel¹⁸

SOURCE: AN SSSR. Doklady, v. 161, no. 4, 1965, 886-888

TOPIC TAGS: secondary emission, steel surface oxidation, iron pentacarbonyl, ferrous hydroxide, argon ion beam, steel

ABSTRACT: The article presents preliminary results of a study of the processes occurring on the surface of steel during heating in a vacuum of 10^{-5} mm Hg and oxygen (1×10^{-4} mm Hg), carried out with the aid of secondary ion emission. The secondary ion emission was a steel strip containing 0.45% Mn, 0.28% Cr, 0.015% P and 0.01% Si. The primary beam was argon ions accelerated to 20 kev. Curves for the intensity of the various ions versus the temperature of the steel strip are given. The formation

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L 46183-65

ACCESSION NR: AP5010839

2
of ferric oxide on the steel surface is due to oxygen in the residual gas. However at oxygen pressures higher than $2 \cdot 10^{-5}$ mm Hg there is no increase in the intensity of the Fe^{2+} ion beam, and therefore no increase in the oxide coating on the steel surface. In the 20-500° range, the rate of decomposition of ferric oxide increases with temperature more rapidly than the rate of oxide formation, and thus the oxide coating. In the 500-800° range the situation is reversed and the oxide coating increases. The formation of the oxide coating is also influenced by the pressure of water vapor. The coating of the steel with ferric oxide is particularly above 200°. A definite part in the mechanism of formation of the pentacarbonyl is played by the carbon present in the steel. The oxidation of the steel may constitute the first stage of formation of the pentacarbonyl. If the temperature is high, the formation and evaporation of the pentacarbonyl will lead to the deterioration of steel. "We consider it our pleasant duty to thank you for your steady interest in this work." Orig. art. has 10 figures.

ASSOCIATION: Khar'kovskiy gosudarstvennyy universitet im. A. M. Gorkogo (Kharkov University).

Card 2/3

L 46183-65 -

ACCESSION NR: AP5010839

SUBMITTED: 20Ju164

ENCL: 00

SUB CODE: MM

NO REF SOV: 007

OTHER: 000

me
Card 3/3

L 22662-66 EWT(1)/EWT(m) WW/CW

ACC NR: AP6006787

SOURCE CODE: UR/0033/66/043/001/0209/0219

AUTHORS: Koval', A. G.; Koppe, V. T.; Fogel', Ya. M.

ORG: Kharkov State University im. A. M. Gor'kiy (Khar'kovskiy gos. universitet)

TITLE: Emission spectra of CO, CO₂, and NO excited by electrons with energies of 13 kev

SOURCE: Astronomicheskij zhurnal, v. 43, no. 1, 1966, 209-219

TOPIC TAGS: emission spectrum, electron bombardment, electron beam, proton bombardment, carbon monoxide, carbon dioxide, nitrous oxide

ABSTRACT: This paper is a continuation of a study of emission spectra of N₂, O₂, and air excited by electrons with energies in the kev range. The experimental setup for the present work on CO, CO₂, and NO was similar to that used in the previous work by the present authors (Kosmicheskiye issledovaniya 4, No. 1, 1966). The gas pressure in the emission chamber was (1--2) 10⁻² mm Hg, and the current of the beam was 1.5--2 ma. Emission spectra for the three indicated gases were obtained for excitation with electrons having energies of 13 kev. The

Card 1/2

UDC: 523.035 2

L 22662-66

ACC NR: AP6006787

spectrograms are reproduced, and the lines are tabulated for each gas (119 for CO, 153 for CO₂, and 43 for NO), with interpretations, relative intensities, and (for CO and CO₂) comparison of intensities with proton excitation of 37 kev and with the night sky spectrum of Venus.²⁵⁴ The authors conclude from this work that there is substantial difference between spectra of the indicated gases during excitation in gaseous discharge and spectra from excitation by a beam of high-speed electrons. But there is a definite agreement of these spectra with spectra produced by proton excitation of the same gases. This work was carried out in close contact with the Institute of Physics of the Atmosphere AN SSSR, and the authors express sincere thanks to the scientists at this institute for useful discussions of the results. They also thank R. F. Limberg for help in the measurements. Orig. art. has: 3 figures and 3 tables.

SUB CODE: 20 SUBM DATE: 09Aug65/ ORIG REF: C05/ OTH REF: 012

Card 2/2 *sw*

1 0001-66 ENT(1)/FCF LP(c) AT/GA

ACC NR: AP6007737

SOURCE CODE: UR/0293/66/004/001/0074/0088

AUTHORS: Koval', A. G.; Koppe, V. T.; Fogel', Ya. M.

ORG: none

TITLE: Emission spectra of rarefied gas molecules, excited by fast electrons

SOURCE: Kosmicheskiye issledovaniya, v. 4, no. 1, 1966, 74-88

TOPIC TAGS: emission spectrum, nitrogen, oxygen, rarefied gas, electron beam, aurora, spectrograph, *fast electron*

ABSTRACT: The emission spectra of nitrogen was investigated in the visible spectra using a high energy electron beam with 0.1 to 20 kev energy. Similar tests were performed with oxygen but with a 13 kev electron gun. In the nitrogen experiments, the strongest lines were caused by the first negative system (ns) bands of molecular N_2^+ followed by the weaker (by a factor of 2--3) first positive system (ps) of molecular nitrogen. The change in distribution of relative intensities of N_2 1-ps, N_2 2-ps, and N_2^+ 1-ns was also investigated. The relative intensities for 100 ev and 13 kev energies in nitrogen are given in tabular form. The relative intensities of these lines are also plotted as a function of the electron energies and show (in all cases) a sharp decrease as the electron energy is increased. The results are compared with 37 kev proton excitation studies of nitrogen and are found to show the same emission bands. Fundamentally, a similar type of emission lines is observed in

Card 1/2

UDC: 535.352+539.196.5

70
64
B

L 40051-66

ACC NR: AP6007737

the auroral spectra as in these laboratory tests. The strongest lines in oxygen were those generated by the first negative bands of O_2^+ . However, the laboratory emission spectra of oxygen differed considerably from the auroral spectra. Similar tests in air showed that the results were additive. It is concluded that kev electrons play a large role in auroral phenomena, however, slow electrons seem to play an equally strong role, and a large amount of oxygen dissociation exists in an auroral display. The authors express their gratitude to their scientific colleagues, of the Institute of Atmospheric Physics of the Academy of Sciences SSSR (Institut fiziki atmosfery AN SSSR), Yu. I. Gal'perin and N. N. Shefov, for taking an active part in evaluating and encouraging this investigation. The graduate student V. V. Pomerantzev of Khar'kov State University (Khar'kovskiy gosudarstvennyy universitet) participated in the preparation of the spectrograms. Orig. art. has: 3 tables and 3 figures.

SUB CODE: 20, 04/ SUBM DATE: 10Jun65/ ORIG REF: 007/ OTH REF: 011

Card 2/2 *ad*

L 40843-66 EWT(1) IJP(c) AT

ACC NR: AP6020199

SOURCE CODE: UR/0056/66/050/006/1464/1471 ^{6/}_B

AUTHOR: Polvakova, G. N.; Tatus', V. I.; Strel'chenko, S. S.; Fogel, Ya. M.; Fridman, V. M.

ORG: Physicotechnical Institute, Academy of Sciences, Ukrainian SSR
(Fiziko-tekhnicheskii institut Akademii nauk Ukrainiskoy SSR)

TITLE: Distribution by rotational energy level of molecules excited by ion impact ^{2/}

SOURCE: Zh eksper i teor fiz, v. 50, no. 6, 1966, 1464-1471

TOPIC TAGS: molecular spectrum, proton reaction, hydrogen atom reaction, spectral energy distribution, Boltzmann distribution, ion impact, rotation energy

ABSTRACT: The experimental apparatus and methodology are described for investigating the intensity distribution in the rotational structure of molecular spectrum bands. The intensity distributions of rotational lines of the $\lambda = 3914$ and $\lambda = 4278$ Å bands have been investigated in the spectrum of the first negative system of N_2^+ excited by impact of the mixed beam of 30-keV protons and hydrogen atoms. It has been observed that the distribution of the rotational line

Card 1/2

L 40843-66

ACC NR: AP6020199

intensity deviates from the Boltzmann distribution by an amount which exceeds the allowable measurement error. Orig. art. has: 4 figures and 1 formula. [Based on authors' abstract] [NT]

SUB CODE: 20/ SUBM DATE: 06Jan66/ ORIG REF: 003/ OTH REF: 009

Card 2/2 *MLP*

EC NR: AP6036048

SOURCE CODE: UR/0056/66/051/004/1007/1010

AUTHOR: Gusev, V. A.; Pilipenko, D. V.; Fogel', Ya. M.

ORG: Physicotechnical Institute, AN UkrSSR (Fiziko-tekhnicheskiy institut, AN UkrSSR)

TITLE: Slow ion formation with the passage of fast protons and hydrogen atoms through nitrous oxide

SOURCE: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 51, no. 4, 1966, 1007-1010

TOPIC TAGS: ion, negative ion, ion exchange, mass spectrum, proton

ABSTRACT: An investigation is made of the mass spectra of slow positive ions produced as a result of dissociative ionization of N_2O molecules by fast protons or hydrogen atoms and also of the mass spectra of slow negative ions produced as a result of charge exchange between the hydrogen atom and an N_2O molecule. The relative intensities of the slow ion beams are compared with the bond breaking energies of N_2O . The authors express their gratitude to G. N. Polyakova for

Card 1/2

ACC NR: AP6036048

investigating the N_2O luminescence spectrum produced by the proton impact.
Orig. art. has: 4 formulas and 1 figure. [Authors' abstract]

[AM]

SUB CODE: 20/SUBM DATE: 16Apr66/ORIG REF: 006/OTH REF: 009/

Card 2/2

FOGEL', Ye.

Small carbon rings. Usp. khim. 30 no. 1:92-141 Ja '61.

(MIRA 14:2)

(Cyclic compounds)

FOGEL', Yu.

Light conveyer bridge. Stroitel' 2 no.9:28 S '56.
(Bridges) (Conveying machinery)

(MIRA 10:1)

FOGEL', Yu. K. (Tbilisi)

"An Investigation of the Pressure Losses in Closed Hydraulic Channels in the USSR."

report presented at the First All-Union Congress on Theoretical and Applied Mechanics, Moscow, 27 Jan - 3 Feb 1960.

FOGEL', YU. M.

FOGEL', YU. M. - Nauchn. sotr. i GVELESIANI, L. G. - Kand. tekhn. nauk St. Nauchn. sotr.

Tbilisskiy nauchno-issledovatel'skiy institut sooruzheniy i gidroznergetiki.

Issledovaniye koefitsiyenta sherokhovatosti tunelei na deistvuyushchikh
ges zakavkaz'ya Page 84

SO: Collection of Annotations of Scientific Research Work on Construction, completed
in 1950.
Moscow, 1951

KUDRITSKIY, R.; VOLKOV, A.; FOGEL', Z.; PODOBED, Yu.; TITOV, A.; SHEIN, R.;
LITSITIS, Ya. [Licitis, J.]; OSTROVENETS, V.; SEMENTSOV, N.

Specialization is indispensable. Tekh. est. no. 4:22-23 Ap '65.
(MIRA 18:6)

1. Spetsial'noye khudozhestvenno-konstruktorskoye byuro Kiyevskogo soveta narodnogo khozyaystva (for Kudritskiy, Volkov, Fogel').
2. Spetsial'noye khudozhestvenno-konstruktorskoye byuro Soveta narodnogo khozyaystva Moskovskogo gorodskogo ekonomicheskogo rayona (for Podobed).
3. Spetsial'noye khudozhestvenno-konstruktorskoye byuro Soveta narodnogo khozyaystva Leningradskogo ekonomicheskogo rayona (for Titov).
4. Spetsial'noye khudozhestvenno-konstruktorskoye byuro Sredne-Ural'skogo soveta narodnogo khozyaystva (for Shein).
5. Spetsial'noye khudozhestvenno-konstruktorskoye byuro Soveta narodnogo khozyaystva Latvyskoy SSR (for Litsitis, Ostrovenets, Sementsov).

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(DENTAL INSTRUMENTS AND APPARATUS)

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uchastiye: ALEKSANDROVA, L.I., kand.tekhn.nauk; TOLVINSKAYA, A.V.,
kand.tekhn.nauk; IVASHCHENKO, S.A., kand.tekhn.nauk; MELENT'YEVA,
N.N., inzh.; RODIONOVA, N.A., inzh.; FOGEL'GEZANG, Ye.V., inzh.
RENNE, V.T., prof., doktor tekhn.nauk; ZHITNIKOVA, O.S., tekhn.red.

[Moisture absorption by organic dielectrics] Vlagopronitsaemost'
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(Dielectrics)

FOGEL'MAN, D.

Training the Society's shooting instructors. Voen. znan. 30
no. 8:14 Ag '54. (MIRA 8:1)

1. Instruktor Kirovskogo rayonnogo strelkovc-sportivnogo
kluba Donsafa g. Moskv. (Shooting)

FOGELMAN, N. A. Cand Geolog-Mineralog Sci

Dissertation: Geological Conditions Surrounding the Formation of
the Gold Ore Province in North Kazakhstan." Moscow Geological
Prospecting Inst imeni S. Ordzhonikidze. 14 May 47

SO: Vechernyaya Moskva, May 1947 (Proj #17836)

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deposit of Transbaikalia. Biul. MOIP. Otd. geol. 39 no.2:90-100
Mr-Ap '64. (MIRA 19:1)

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tectonic development of the area. Geol.sbor. [Lvov]
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SO: Mathematics in the USSR, 1917-1947
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Markushevich, A. L.
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SO: U-3736, 21 May 53, (Letopis 'Zhurnal 'nykh Statey, No. 17, 1949).

1. FOGELIS, Ye.
2. USSR (600)
4. Mathematics - Formulas
7. Finite proof of Gauss-Dirichlet formulas. Latv.PSR Zin.Akad.Vestis no. 9, 1950.

9. Monthly Lists of Russian Accessions, Library of Congress, March 1953, Unclassified.

S/169/63/000/001/035/062
D218/D307

AUTHORS: Fogel'man, N.A., Zorina, V.S. and Solodov, A.A.

TITLE: Data for the development of a method of preparing prognostic charts for the gold-bearing region of East Transbaykal

PERIODICAL: Referativnyy zhurnal, Geofizika, no. 1, 1963, 6, abstract 1D33 (Tr. Tsentr. i.-i. gornorazved. in-ta, 1961, no. 44, 20-23)

TEXT: In order to rationalize prospecting operations, it was necessary to prepare prognostic charts for the main gold bearing region of East Transbaykal, showing regularities in the distribution of major gold concentrations. The following principles and geological gold prognostic charts are suggested for the preparation of such charts: 1) direct reconstruction of empirical data on a specialized geo-structural basis, showing the relationship between gold deposits and various local geostructural elements, i.e. the reconstruction of ore-controlling factors for the given region; 2) utilization of

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D218/D307

Data for the development ...

exploration data collected over many years for the existing gold deposits in the given region and any regularities concerning the localization of ores with respect to the local geological structure; 3) knowledge of leading most promising types of gold depositions of the early Kimmeridge and Laramie metallogenic periods (baleyan and darasunyan) [Abstracter's note: Names unknown] and the necessity of assessing new types of deposits which are present in other regions and are industrially important; 4) relation of the deposits to definite types of magnetic formations; 5) structural localization regularities of deposits: (a) ore-controlling significance of tectonic dislocations and jointing zones which reflect discontinuities in plutonic structural stages; (b) regional development of 'transverse' ore-controlling jointing zones which determine the structural position of industrial ore fields and promising regions; (c) effect of block tectonics on the distribution of various types of hydrothermal mineralization which may serve as a basis for detailed metallogenic regional classification; (d) relation of Laramian volcanism and mineralization with subsidence blocks - upper

Card 2/3

Data for the development ...

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D218/D307

Mesozoic tectonic depressions and transverse fractures; (e) possible screening effect of structural elements on the localization of baleyen-type gold deposits in the Lower Chalk depressions. In setting up gold prognostic charts, it is necessary to carry out special field studies, including composite geophysical methods.

/ Abatracter's note: Complete translation /

Card 3/3

$$L_{\text{eff}} = \frac{1}{2} \left(\frac{1}{\mu_0} + \frac{1}{\mu_0'} \right) \frac{1}{\mu_0 \mu_0'}$$

1. L. K. Analogue of the Brun-Titchmarsh theorem.

Latvijas PSR Zinātņu Akad. Fiz. Mat. Inst. Raksti. 2.

1988 (1989). (Russian. Latvian summary.)

The theorem mentioned in the title is the result that the number of primes not exceeding x in an arithmetic progression

with difference k , x^a , $0 < a < 1$, is $O(x^{1-a}/k \log x)$.

Math. USSR Izv. 23 (1985), no. 3, 541-542.

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1. FOGELIS, YE.
2. SSSR (600)
4. Numbers, Prime
7. Elementary proff of Vallee-Poussin formulas.
Latv. PSR Zin. Akad. Vestis No. 11, 1950

9. Monthly Lists of Russian Accessions, Library of Congress, March 1953, Unclassified.

1. FOJELIS, YE.
2. USSR (600)
4. Function, Exponential
7. Finite theory of elementary functions. Latv. PSR Zin, Akad. Vestis 5, 1951

Page 1453

9. Monthly List of Russian Accessions, Library of Congress, January, 1953. Unclassified.

FOGEL, E. K.

Mathematical Review
June 1954
Number Theory

10.5.54 LL

Fogel, E. K. An elementary proof of formulae of de la Vallée Poussin. Latvijas PSR Zinātņu Akad. Vestis 1950, no. 11 (40), 123-130 (1950). (Russian. Latvian summary)

The author discusses by elementary methods, involving only finite sums and the properties of a^x , $\log x$, $\sin x$, $\cos x$, the asymptotic relations

$$\sum_{\substack{p \leq x \\ p \equiv l(k)}} 1 \sim \frac{x}{h \log x}, \quad \sum_{\substack{n \leq x \\ n \equiv l(k)}} \lambda(n) = o(x), \quad \sum_{\substack{n \leq x \\ n \equiv l(k)}} \mu(n) = o(x),$$

where $(l, k) = 1$, $h = \varphi(k)$, p runs through primes, and $\lambda(n)$ and $\mu(n)$ are the functions of Liouville and Möbius. The proof of the first formula follows the lines of A. Selberg's elementary proof of the prime number theorem (the special case $k=1$). A substantial part of the argument is taken up with a proof, according to the author's canons, of the formula

$$\sum_{\substack{p \leq x \\ p \equiv l(k)}} \frac{\log p}{p} = \frac{1}{h} \log x + O(1)$$

1/2

4

0

0

(2)

of Mertens; this involves the use of real and complex characters. (In a footnote the author acknowledges Selberg's treatment of the general case $k \geq 1$ by the use of real characters, his own work having been done in ignorance of this.) It is stated that the second and third results can be deduced from the first by methods used in a previous paper by the author [Latvijas PSR Zinātņu Akad. Fiz. Mat. Inst. Raksti, 2, 14-45 (1950); these Rev. 13, 824]. The concluding section is devoted to analogues concerning primes representable by a positive definite binary quadratic form.

A. E. Ingham (Cambridge, England).

12
Fogel, E.K.

FOGEL' (FOGELIS), E.K.

Mathematical Reviews
Vol. 15 No. 3
March 1954
Analysis

7954
LL

① 7/11/11
Fogel' [Fogelis], E. K. A finite theory of elementary functions. I. Logarithmic and exponential functions. Latvijas PSR Zinātņu Akad. Vēstis 1951, no. 5 (46), 801-813 (1951). (Russian. Latvian summary)

The author develops "finite" analogues of such functions as e^x , x^x , and $\log x$. This consists essentially of working, for x in a given interval, with suitable partial sums of the well known power series expansions of these functions, and examining to what extent these partial sums inherit approximations of certain well known properties of these functions. For example, considering x in the interval $[-X, X]$ the function $E(x) = 1 + x + x^2/2! + \dots + x^M/M!$, where $M = 4X^2$, serves as the "finite" analogue of e^x . Similar constructions are given for "finite" analogues of $\log x$ and x^x , and the relationships between them investigated.

H. N. Shapiro (New York, N. Y.).

USSR/ Mathematics - Arithmetic progression

Card 1/1 Pub. 22 - 9/62

Authors : Fogels, E. K.

Title : About prime numbers at the beginning of an arithmetic progression

Periodical : Dok. AN SSSR 102/3, 455 - 456, May 21, 1955

Abstract : A proof is given that by using Rodosskiy's weaker instead of Linnik's fundamental lemmas a strict proof of Linnik's theorem can be obtained. Linnik's theorem proves that there is an absolute number $c > 1$ for which, in the range $1 < c < D$, there is always at least one prime number for any arithmetical progression $Du + \ell$, where $(d, \ell) = 1$ and $u = 0, 1, \dots$. Two USSR references (1944 and 1954).

Institution :

Presented by: Academician I. M. Vinogradov, January 31, 1955

FOGELS, E.K.

Prime numbers in short arithmetic progressions. Dokl. AN SSSR .133
no.5:1038-1040 Ag. '60. (MIRA 13:8)

1. Latvyskiy gosudarstvennyy universitet im. P.Stuchki.
Predstavleno akad. I.M.Vinogradovym.
(Numbers, Prime)

FOGELS, E.K.

Distribution of simple ideals. Dokl. AN SSSR 140 no.5:1029-
1032 0 '61. (MIRA 15:2)

1. Latviyskiy gosudarstvennyy universitet im. Petra Stuchki.
Predstavleno akademikom A.I.Mal'tsevim.
(Rings(Algebra))

FOGELS, E. (Riga)

On the zeros of Hecke's L-functions I. Acta arithmetica 7 no. 2;
87-106 '62.

FOGELS, E. (Riga)

On the zeros of Hecke's L-functions II. Acta arithmetica 7 no. 2:
131-147 '62.

FOGELS, E. (Riga)

On the zeros of Hecke's L-functions. III. Acta arithmetica 7 no.3:225-
240 '62.

FOGELS, E. (Riga)

On the distribution of prime ideals. Acta arithmetica 7 no.3:255-269
'62.

FOGELS, E.

Distribution of analogues of prime numbers. Dokl. AN SSSR 146
no.2:318-321 S '62. (MIRA 15:9)

1. Latviyskiy gosudarstvennyy universitet im. Petra Stuchki.
Predstavleno akademikom I.M. Vinogradovym.
(Numbers, Prime) (Forms, Quadratic)

FOGELS, E. (Riga)

On the abstract theory of primes. Pt. 1. Acta arithmetica 10
no.2:137-182 '64.

1. Submitted June 8, 1963.